

## CLAIMS

1. A mutant  $\alpha$ -amylase which is derived from an  $\alpha$ -amylase having an amino acid sequence represented by SEQ ID No. 1 or showing at least 60% homology thereto by substitution or deletion of at least one amino acid residue corresponding to any one of Pro<sub>18</sub>, Gln<sub>86</sub>, Glu<sub>130</sub>, Asn<sub>154</sub>, Arg<sub>171</sub>, Ala<sub>186</sub>, Glu<sub>212</sub>, Val<sub>222</sub>, Tyr<sub>243</sub>, Pro<sub>260</sub>, Lys<sub>269</sub>, Glu<sub>276</sub>, Asn<sub>277</sub>, Arg<sub>310</sub>, Glu<sub>360</sub>, Gln<sub>391</sub>, Trp<sub>439</sub>, Lys<sub>444</sub>, Asn<sub>471</sub> and Gly<sub>476</sub> of the amino acid sequence.

2. A mutant  $\alpha$ -amylase derived from an  $\alpha$ -amylase having an amino acid sequence represented by SEQ ID No. 2 or showing at least 60% homology thereto by substitution or deletion of at least one amino acid residue corresponding to any one of Asp<sub>128</sub>, Gly<sub>140</sub>, Ser<sub>144</sub>, Arg<sub>168</sub>, Asn<sub>181</sub>, Glu<sub>207</sub>, Phe<sub>272</sub>, Ser<sub>375</sub>, Trp<sub>434</sub> and Glu<sub>466</sub> of the amino acid sequence.

3. A mutant  $\alpha$ -amylase according to claim 1, wherein the substitution or deletion of at least one amino acid residue is substitution of the amino acid residue corresponding to Pro<sub>18</sub> with Ser or Thr, the amino acid residue corresponding to Gln<sub>86</sub> with Glu, the amino acid residue corresponding to Glu<sub>130</sub> with Val or Gln, the amino acid residue corresponding to Asn<sub>154</sub> with Asp, the amino acid residue corresponding to Arg<sub>171</sub> with Cys or Gln, the amino acid residue corresponding to Ala<sub>186</sub> with Val or Asn, the amino acid residue corresponding to Glu<sub>212</sub> with Asp, the

amino acid residue corresponding to Val<sub>222</sub> with Glu, the  
amino acid residue corresponding to Tyr<sub>243</sub> with Cys or Ser,  
the amino acid residue corresponding to Pro<sub>260</sub> with Glu, the  
amino acid residue corresponding to Lys<sub>269</sub> with Gln, the  
5 amino acid residue corresponding to Glu<sub>276</sub> with His, the  
amino acid residue corresponding to Asn<sub>277</sub> with Ser or Phe,  
the amino acid residue corresponding to Arg<sub>310</sub> with Ala, the  
amino acid residue corresponding to Glu<sub>360</sub> with Gln, the  
amino acid residue corresponding to Gln<sub>391</sub> with Glu, the  
10 amino acid residue corresponding to Trp<sub>439</sub> with Arg, the  
amino acid residue corresponding to Lys<sub>444</sub> with Arg, the  
amino acid residue corresponding to Asn<sub>471</sub> with Asp or Glu,  
or the amino acid residue corresponding to Gly<sub>476</sub> with Asp;

4. A mutant  $\alpha$ -amylase according to claim 2, wherein  
15 the substitution or deletion of at least one amino acid  
residue is substitution of the amino acid residue  
corresponding to Asp<sub>128</sub> with Val or Gln, the amino acid  
residue corresponding to Gly<sub>140</sub> with Ser, the amino acid  
residue corresponding to Ser<sub>144</sub> with Pro, the amino acid  
20 residue corresponding to Arg<sub>168</sub> with Gln, the amino acid  
residue corresponding to Gln<sub>181</sub> with Val, the amino acid  
residue corresponding to Glu<sub>270</sub> with Asp, the amino acid  
residue corresponding to Phe<sub>272</sub> with Ser, the amino acid  
residue corresponding to Ser<sub>375</sub> with Pro, the amino acid  
25 residue corresponding to Trp<sub>434</sub> with Arg or the amino acid

residue corresponding to Glu<sub>466</sub> with Asp.

5. A gene encoding a mutant  $\alpha$ -amylase as claimed in any one of claims 1 to 4, or a vector containing said gene.

6. A cell transformed by a vector as claimed in claim

5 5.

7. A method for producing a mutant  $\alpha$ -amylase, which comprises cultivating a transformant cell as claimed in claim 6.

10 8. A detergent composition comprising a mutant  $\alpha$ -amylase as claimed in any one of claims 1 to 4.